CLAIMS

1. A method of effectuating a neural-function of a patient associated with a first location of the brain of the patient, comprising:

identifying a stimulation site by generating remotely from the first location an intended neural activity and determining a region of the brain where the generated neural activity is present;

positioning at least a first electrode at the stimulation site; and

applying an electrical potential to pass a current through the first electrode.

2. The method of claim 1 wherein the neural-function has been affected by brain damage to the first region of the brain, and wherein:

generating the intended neural activity comprises applying an input for the neural function that causes a signal to be sent to the brain; and

determining a region of the brain wherein the generated neural activity is present comprises detecting the neural activity that occurs in response to the signal sent to the brain.

3. The method of claim 2 wherein the neural function controls use of a body part, and applying an input for the neural function comprises moving the body part.

4. The method of claim 2 wherein the neural function controls use of a body part, and applying an input for the neural function comprises applying a peripheral electrical stimulation to the body part.

5. The method of claim 2 wherein detecting neural activity comprises imaging of the brain.

6. The method of claim 2 wherein detecting neural activity comprises taking a functional MRI image of the brain.

7. The method of claim 2 wherein the neural function controls use of a body part, and wherein:

applying an input to the neural function comprises moving the body part; and

imaging the brain for neural activity comprises taking a functional MRI image of the brain.

8. The method of claim 1 wherein identifying a stimulation site comprises applying an input for the neural function that causes a signal to be sent to the brain.

9. The method of claim 8 wherein the neural function controls use of a body part, and applying an input for the neural function comprises moving the body part.

10. The method of claim 8 wherein the neural function controls use of a body part, and applying an input for the neural function comprises applying a peripheral electrical stimulation to the body part.

11. The method of claim 1 wherein the neural-function has been affected by damage, disease and/or a disorder at the first region of the brain, and wherein:

generating the intended neural activity comprises applying a peripheral input to the patient for effectuating the neural function that causes a signal to be sent to the brain; and

determining a region of the brain wherein the generated neural activity is present comprises detecting a change in neural activity in response to the signal sent to the brain.

12. The method of claim 11 wherein determining a region of the brain where the generated neural activity is present comprises determining a location in the brain different than the first location at which the generated neural activity occurs.

13. The method of claim 11 wherein determining a region of the brain where the generated neural activity is present comprises determining a location at which a change in neural activity occurs in correspondence to a change in the neural-function.

14. The method of claim 1 wherein positioning at least a first electrode at the stimulation site comprises positioning first and second electrodes at the stimulation site and resiliently biasing at least one of the first and second electrodes against a surface of the brain.

15. The method of claim 1 wherein positioning at least a first electrode at the stimulation site comprises positioning first and second electrodes at the stimulation site and resiliently biasing at least one of the first and second electrodes against the pia mater.

16. The method of claim 1, further comprising implanting a stimulation apparatus having an integrated pulse system directly coupled to the first electrode so that the stimulation apparatus is adjacent to and/or within the skull of the patient, and wherein positioning the first electrode comprises placing the first electrode at least proximate to the pia mater.

17. The method of claim 1, further comprising implanting a stimulation apparatus having an integrated pulse system directly coupled to the first electrode so that the stimulation apparatus is adjacent to and/or within the skull of the patient, and wherein positioning the first electrode comprises inserting the first electrode into the cortex of the brain.

18. The method of claim 1 wherein applying an electrical potential comprises placing a voltage of ±1 mV to ±10 V between the first electrode and a second electrode.

19. The method of claim 1 wherein applying an electrical potential comprises generating electrical pulses at 2 to 1000 Hz.

20. The method of claim 1, further comprising ascertaining a threshold for generating action potentials for cells at the stimulation site, and wherein applying an electrical potential comprises placing a subthreshold voltage less than the threshold for generating action potentials .

21. The method of claim 1, further comprising ascertaining a threshold for generating action potentials for cells at the stimulation site, and wherein applying an electrical potential comprises placing a subthreshold voltage between the first electrode and a second electrode approximately 10-40% less than the threshold for generating action potential .

22. The method of claim 1, further comprising ascertaining a threshold for generating electrophysiologic signals associated with the neural function, and wherein applying an electrical potential comprises placing a subthreshold voltage between the first electrode and a second electrode less than the threshold for generating electrophysiologic signals.

23. The method of claim 1, further comprising ascertaining a threshold for generating electrophysiologic signals for cells at the stimulation site, and wherein applying an electrical potential comprises placing a subthreshold voltage between the first electrode and a second electrode 20-50% less than the threshold for generating electrophysiologic signals.

24. The method of claim 1, further comprising ascertaining a threshold for eliciting the neural function, and wherein applying an electrical potential comprises placing a subthreshold voltage between the first electrode and a second electrode less than the threshold for eliciting the neural function.

25. The method of claim 1, further comprising ascertaining a threshold for eliciting the neural function, and wherein applying an electrical potential comprises placing a

subthreshold voltage between the first electrode and a second electrode 30-60% less than the threshold for eliciting the neural function.

26. The method of claim 1 wherein a motor function and/or a sensory function of a body part controlled by the neural-function has been affected by brain damage to the first region of the brain, and wherein the method further comprises performing physical therapy to the affected body part while or immediately after applying the electrical potential between the first electrode and a second electrode.

27. The method of claim 1 wherein a motor function and/or a sensory function of a body part controlled by the neural-function has been affected by brain damage to the first region of the brain, and wherein the method further comprises pharmaceutically stimulating the brain while applying the electrical potential between the first electrode and a second electrode.

28. A method of effectuating a neural-function of a brain of a patient associated with a first location in the brain, comprising:

identifying a stimulation site in and/or on the brain where neural activity has changed in response to a change in the neural-function in the first location of the brain;

positioning a first electrode at the stimulation site;

positioning a second electrode at the stimulation site; and

applying an electrical potential between the first and second electrodes.

29. The method of claim 28 wherein identifying a stimulation site comprises imaging the cortex of the brain.

30. The method of claim 28 wherein identifying a stimulation site comprises:

taking a first image of the brain that shows neural activity related to the neural-function using functional MRI;

taking a second image of the brain that shows neural activity related to the neural-function using functional MRI after taking the first image of the brain; and

comparing a change in the neural activity related to the neural-function.

31. The method of claim 28, further comprising applying a peripheral input to the patient that is expected to generate neural activity in the brain related to performing the neural-function.

32. The method of claim 28, further comprising:

applying a peripheral input to the patient that is expected to generate neural activity in the brain that performs the neural-function; and

identifying a stimulation site comprises taking a first image of the brain that shows neural activity before applying the peripheral input, taking a second image of the brain that shows neural activity while applying the peripheral input, and comparing a change in neural activity in the brain between the first and second images.

33. The method of claim 28 wherein neural activity for the neural-function is expected to occur at the first location in the brain according to a known functional organization of the brain, and wherein identifying the stimulation site comprises detecting neural activity for the neural-function at a second location in the brain different than the first location.

34. The method of clam 33 wherein detecting the neural activity comprises taking functional MRI images of the brain and monitoring neural activity at the second location.

35. The method of claim 28 wherein the neural-function controls learning a task and the neural activity related to the neural function is expected to occur at the first location of the brain according to a known functional organization of the brain, and wherein identifying the stimulation site comprises detecting a change in the neural activity at the first location of the brain while the patient learns the task.

36. The method of clam 35 wherein detecting a change in the neural activity comprises taking functional MRI images of the brain while the patient learns the task.

37. The method of claim 28 wherein the neural-function controls learning a task and the neural activity related to the neural function is expected to occur at the first location of the brain according to a known functional organization of the brain, and wherein identifying the stimulation site comprises detecting a change in the neural activity at a second location different than the first location of the brain while the patient learns the task.

38. The method of clam 37 wherein detecting a change in the neural activity comprises taking functional MRI images of the brain while the patient learns the task.

39. The method of claim 28 wherein the first region of the brain is affected by a disease and neural activity related to the neural-function is expected to occur at the first location of the brain according to a known functional organization of the brain, and wherein identifying the stimulation site comprises detecting a change in neural activity adjacent to the first region.

40. The method of claim 28 wherein the first region of the brain is affected by a disease and neural activity related to the neural-function is expected to occur at the first location of the brain according to a known functional organization of the brain, and wherein identifying the stimulation site comprises detecting a change in neural activity related to the neural-function at a second location different than the first location.

41. The method of claim 28 wherein the first region of the brain is affected by brain damage and neural activity related to the neural-function is expected to occur at the first location of the brain according to a known functional organization of the brain, and wherein identifying the stimulation site comprises detecting a change in neural activity adjacent to the first region.

42. The method of claim 28 wherein the first region of the brain is affected by brain damage and neural activity related to the neural-function is expected to occur at the first location of the brain according to a known functional organization of the brain, and wherein identifying the stimulation site comprises detecting a change in neural activity related to the neural-function at a second location different than the first location.

43. A method of treating a loss of a neural-function at a first cortical location of a brain of a patient, comprising:

selecting a stimulation site at a cortical region of the brain where neural activity is expected to occur to compensate for the loss of neural-function at the first cortical location of the brain;

positioning a first electrode at a first area of the stimulation site proximate to the pia mater in the cortical region;

positioning a second electrode at a second area of the stimulation site proximate to the pia mater in the cortical region; and

applying an electrical potential between the first and second electrodes.

44. The method of claim 43 wherein the neural-function is generally carried out by neural activity at the first region of the brain according to a known functional organization of the brain, and wherein selecting a stimulation site comprises estimating a location of a second region of the brain where neural activity for performing the neural-function is expected to be present, the location of the second region being spaced apart from the first region.

45. The method of claim 43 wherein:

selecting the stimulation site comprises determining a location at which neuroplasticity for implementing the neural-function is expected to occur; and

applying an electrical potential comprises placing an electrical pulse across the first and second electrodes without imaging the brain for neural activity related to the neural-function.

46. The method of claim 43 wherein selecting the stimulation site comprises determining a location adjacent to the first location of the brain.

47. A method of treating a neural-function in a brain of a patient using an apparatus having a support member, a pulse system carried by the support member, and an electrode assembly including first and second electrodes at an interior surface of the support member, comprising:

implanting the support member in the patient proximate to a skull of the patient to position the pulse system proximate to the skull and to position the first and second electrodes proximate to a stimulation site on and/or in the brain of the patient; and

controlling the pulse system to apply an electrical potential between the first and second electrodes at the stimulation site.

48. A method of treating a neural-function in a brain of a patient using an apparatus having a support member, a pulse system carried by the support member, and an electrode assembly including first and second electrodes at an interior surface of the support member, comprising:

implanting the support member proximate to a skull of the patient to position the first and second electrodes at least proximate to the pia mater of the brain of the patient at a first cortical location;

mechanically biasing the support member and/or the first and second electrodes to resiliently press the first and second electrodes against one of the dura mater or the pia mater of the brain of the patient at the first cortical region; and

controlling a pulse generator coupled to the first and second electrodes to apply an electrical potential between the first and second electrodes in the first cortical region of the brain.

49. A method of treating a neural-function in a brain of a patient, comprising:

selecting a stimulation site in a first cortical region of the brain;

determining an electrical stimulation threshold for inducing a response in cells at the stimulation site; and

applying an electrical stimulation at an intensity lower than the stimulation threshold between first and second electrodes proximate to the pia mater of the first cortical region of the brain.

50. The method of claim 49, further comprising identifying the stimulation site by determining where neural activity has changed in response to a change in the neural-function.

51. The method of claim 50 wherein identifying a stimulation site comprises:

taking a first image of the brain that shows neural activity related to the neural-function using functional MRI;

taking a second image of the brain that shows neural activity related to the neural-function using functional MRI after taking the first image of the brain; and

comparing a change in the neural activity related to the neural-function.

52. The method of claim 50, further comprising applying a peripheral input to the patient that is expected to generate the neural activity in the brain related to performing the neural-function.

53. The method of claim 50, further comprising:

applying a peripheral input to the patient designed to generate the neural activity in the brain that performs the neural-function; and

identifying a stimulation site comprises taking a first image of the brain that shows neural activity before applying the peripheral input, taking a second image of the brain that shows neural activity while applying the peripheral input, and comparing a change in neural activity in the brain between the first and second images.

54. The method of claim 50 wherein neural activity for the neural-function is expected to occur at the first location in the brain according to a known functional organization of the brain, and wherein identifying the stimulation site comprises detecting neural activity for the neural-function at a second location in the brain different than the first location.

55. The method of clam 54 wherein detecting the neural activity comprises taking functional MRI images of the brain and monitoring neural activity at the second location.

56. The method of claim 50 wherein the neural-function controls learning a task and the neural activity related to the neural function is expected to occur at the first location of the brain according to a known functional organization of the brain, and wherein identifying the stimulation site comprises detecting a change in the neural activity at the first location of the brain while the patient learns the task.

57. The method of clam 56 wherein detecting a change in the neural activity comprises taking functional MRI images of the brain while the patient learns the task.

58. The method of claim 50 wherein the neural-function controls learning a task and the neural activity related to the neural function is expected to occur at the first location of the brain according to a known functional organization of the brain, and wherein identifying the stimulation site comprises detecting a change in the neural activity at a second location different than the first location of the brain while the patient learns the task.

59. The method of clam 58 wherein detecting a change in the neural activity comprises taking functional MRI images of the brain while the patient learns the task.

60. The method of claim 50 wherein the first region of the brain is affected by a disease and neural activity related to the neural-function is expected to occur at the first location of the brain according to a known functional organization of the brain, and wherein

identifying the stimulation site comprises detecting a change in neural activity adjacent to the first region.

61. The method of claim 50 wherein the first region of the brain is affected by a disease and neural activity related to the neural-function is expected to occur at the first location of the brain according to a known functional organization of the brain, and wherein identifying the stimulation site comprises detecting a change in neural activity related to the neural-function at a second location different than the first location.

62. The method of claim 50 wherein the first region of the brain is affected by brain damage and neural activity related to the neural-function is expected to occur at the first location of the brain according to a known functional organization of the brain, and wherein identifying the stimulation site comprises detecting a change in neural activity adjacent to the first region.

63. The method of claim 50 wherein the first region of the brain is affected by brain damage and neural activity related to the neural-function is expected to occur at the first location of the brain according to a known functional organization of the brain, and wherein identifying the stimulation site comprises detecting a change in neural activity related to the neural-function at a second location different than the first location.

64. The method of claim 50 wherein applying the electrical potential comprises inducing an increase in a resting membrane potential of neurons subject to the electrical potential.

65. The method of claim 64 wherein applying an electrical stimulation comprises providing an electrical potential between the first and second electrodes that increases the resting membrane potential of a desired population of neurons at the stimulation site by 10%-95% of a voltage gap between the resting membrane potential and an action potential for the desired population of neurons.

66. The method of claim 64 wherein applying an electrical stimulation comprises providing an electrical potential between the first and second electrodes that increases the resting membrane potential of a desired population of neurons at the stimulation site by 10%-95% of a voltage gap between the resting membrane potential and an action potential for the desired population of neurons, and wherein the electrical potential is provided at a frequency of approximately 40-200 Hz.

67. The method of claim 64 wherein applying an electrical stimulation comprises providing an electrical potential between the first and second electrodes that increases the resting membrane potential of a desired population of neurons at the stimulation site by 10%-95% of a voltage gap between the resting membrane potential and an action potential for the desired population of neurons, and wherein the electrical potential is provided at a frequency of approximately 40-200 Hz and a pulse width of approximately 20-100μs.

68. The method of claim 64 wherein applying an electrical stimulation comprises providing an electrical potential between the first and second electrodes that increases the resting membrane potential of a desired population of neurons at the stimulation site by 60%-80% of a voltage gap between the resting membrane potential and an action potential for the desired population of neurons.

69. The method of claim 64 wherein applying an electrical stimulation comprises providing an electrical potential between the first and second electrodes that increases the resting membrane potential of a desired population of neurons at the stimulation site by 60%-80% of a voltage gap between the resting membrane potential and an action potential for the desired population of neurons, and wherein the electrical potential is provided at a frequency of approximately 40-200 Hz.

70. The method of claim 64 wherein applying an electrical stimulation comprises providing an electrical potential between the first and second electrodes that increases the resting membrane potential of a desired population of neurons at the

stimulation site by 60%-80% of a voltage gap between the resting membrane potential and an action potential for the desired population of neurons, and wherein the electrical potential is provided at a frequency of approximately 40-200 Hz and a pulse width of approximately 20-100μs.

71. An apparatus for applying electrical stimulation to a region of a brain of a patient, comprising:

an implantable support member configured to be implanted into the patient at least partially within the skull of the patient;

a pulse system carried by the support member;

a first electrode carried by the support member, the first electrode being coupled to the pulse system; and

a second electrode carried by the support member, the second electrode being spaced apart from the first electrode, and the second electrode being coupled to the pulse system.

72. The apparatus of claim 71 wherein the support member comprises an attachment element and a housing carried by the attachment element, the attachment element being attachable to the skull, and the housing carrying the first and second electrodes.

73. The apparatus of claim 72 wherein the attachment element comprises a mesh.

74. The apparatus of claim 72 wherein the attachment element comprises a plate.

75. The apparatus of claim 71 wherein the support member comprises an attachment element and a housing, the attachment element being a mesh, and the housing having a proximal side attached to the attachment element, a distal side to which the first and second electrodes are attached, and a cavity in which the pulse system is housed.

76. The apparatus of claim 71 wherein the support member comprises an attachment element for attachment to the skull and a housing configured to be implanted in a hole in the skull, the housing having a proximal side attached to the attachment element, a distal side to which the first and second electrodes are attached, and a cavity in which the pulse system is housed, and wherein the housing has a depth of approximately 1-2 cm.

77. The apparatus of claim 71 wherein the support member comprises a compressible member configured to be positioned between the skull and the dura mater or pial surface of the brain.

78. The apparatus of claim 71 wherein:

the support member comprises a housing configured to be implanted at least partially within the skull, the housing having a cavity; and

the pulse system comprises a power supply and a pulse generator within the cavity of the housing.

79. The apparatus of claim 71 wherein:

the support member comprises a housing configured to be implanted at least partially within the skull, the housing having a cavity; and

the pulse system comprises a pulse generator within the cavity of the housing.

80. The apparatus of claim 71 wherein:

the support member comprises a housing configured to be implanted at least partially within the skull, and the housing has a cavity; and

the pulse system comprises a pulse delivery system within the cavity of the housing, the pulse delivery system having a receiver for receiving a pulse of broadcast energy generated by an external pulse generator and a pulse former for converting the broadcast energy into an electrical pulse within the support member.

81. The apparatus of claim 71 wherein:

the support member comprises a housing configured to be implanted at least partially within the skull, and the housing has a cavity;

the pulse system comprises a pulse delivery system within the cavity of the housing, the pulse delivery system having a magnetic pickup coil for receiving a pulse of magnetic energy generated by an external pulse generator; and

the first and second electrodes are electrically coupled to the pulse system within the housing.

82. The apparatus of claim 71 wherein:

the support member comprises a housing configured to be implanted at least partially within the skull, and the housing has a cavity;

the pulse system comprises a pulse delivery system within the cavity of the housing, the pulse delivery system having an antenna capable of receiving RF energy and a pulse former coupled to the antenna; and

the first and second electrodes are electrically coupled to the pulse system within the housing.

83. The apparatus of claim 71 wherein the first and second electrodes are conductive elements at a distal surface of the support member for being positioned against the pial surface of the brain or at least proximate to the pial surface, and wherein the first electrode has a generally circular shape and the second electrode has a generally circular shape that surrounds the first electrode.

84. The apparatus of claim 71 wherein the first and second electrodes are conductive elements at a distal surface of the support member for being positioned against the pial surface of the brain or at least proximate to the pial surface, and wherein the first electrode is defined by a first conductive pad at a first area of the distal surface and the second electrode is defined by a second conductive pad at a second area of the distal surface.

85. The apparatus of claim 71, further comprising a third electrode and a fourth electrode coupled to the pulse system, and wherein the first, second, third and fourth electrodes are conductive elements at a distal surface of the support member for being positioned against the pial surface of the brain or at least proximate to the pial surface.

86. The apparatus of claim 87, further comprising a switching circuit having a plurality of switches coupled between the electrodes and the pulse system to selectively generate electrical fields between the first, second, third and fourth electrodes.

87. The apparatus of claim 71 wherein the first and second electrodes comprise implantable pins that project from a distal surface of the support member for penetrating into a cortical region or a deep-brain region of the brain.

88. The apparatus of claim 71, further comprising a mechanical biasing element carried by the support member and coupled to the first and second electrodes.

89. The apparatus of claim 88 wherein the biasing element comprises a compressible foam.

90. The apparatus of claim 88 wherein the biasing element comprises a spring.

91. The apparatus of claim 88 wherein the biasing element comprises an inflatable bladder.

92. The apparatus of claim 71 wherein the housing has an interior surface and the first and second electrodes are carried by the housing to be exposed at the interior surface, and wherein the interior surface has a maximum dimension of not greater than 4 cm.

93. The apparatus of claim 71 wherein the housing has an interior surface and the first and second electrodes are carried by the housing to be exposed at the interior

surface, and wherein the interior surface has a maximum dimension of not greater than approximately 1-2 cm.

94. The apparatus of claim 71 wherein the housing has an outer surface configured to face away from the skull and an interior surface configured to face toward the brain, and wherein the interior surface has a maximum dimension of not greater than approximately 1-2 cm and a depth of the housing between the outer surface and the interior surface is approximately 1-2 cm.

95. An apparatus for applying electrical stimulation to a region of a brain of a patient, comprising:

an implantable support member configured to be implanted into the patient proximate to a skull of the patient, the support member including an attachment element to fix the support member to the skull;

a pulse system carried by the support member;

a first electrode at a first region of the support member, the first electrode being coupled to the pulse system; and

a second electrode at a second region of the support member spaced apart from the first electrode, the second electrode being coupled to the pulse system.

96. The apparatus of claim 95 wherein:

the support member comprises a housing configured to be implanted at least partially within the skull, the housing having a cavity; and

the pulse system comprises a power supply and a pulse generator within the cavity of the housing.

97. The apparatus of claim 95 wherein:

the support member comprises a housing configured to be implanted at least partially within the skull, the housing having a cavity; and

the pulse system comprises a pulse generator within the cavity of the housing.

98. The apparatus of claim 95 wherein:

the support member comprises a housing configured to be implanted at least partially within the skull, and the housing has a cavity; and

the pulse system comprises a pulse delivery system within the cavity of the housing, the pulse delivery system having a receiver for receiving a pulse of broadcast energy generated by an external pulse generator and a pulse former for converting the broadcast energy into an electrical pulse within the support member.

99. The apparatus of claim 95 wherein:

the support member comprises a housing configured to be implanted at least partially within the skull, and the housing has a cavity;

the pulse system comprises a pulse delivery system within the cavity of the housing, the pulse delivery system having a magnetic pickup coil for receiving a pulse of magnetic energy generated by an external pulse generator; and

the first and second electrodes are electrically coupled to the pulse system within the housing.

100. The apparatus of claim 95 wherein:

the support member comprises a housing configured to be implanted at least partially within the skull, and the housing has a cavity;

the pulse system comprises a pulse delivery system within the cavity of the housing, the pulse delivery system having an antenna capable of receiving RF energy and a pulse former coupled to the antenna; and

the first and second electrodes are electrically coupled to the pulse system within the housing.

101. The apparatus of claim 95, further comprising a mechanical biasing element carried by the support member and coupled to the first and second electrodes.

102. An apparatus for applying electrical stimulation to a region of a brain of a patient, comprising:

an implantable support member configured to be implanted into the patient proximate to a skull of the patient;

a pulse system carried by the support member;

a first electrode at a first region of the support member, the first electrode being coupled directly to the pulse system within the support member; and

a second electrode at a second region of the support member spaced apart from the first electrode, the second electrode being coupled directly to the pulse system within the support member.

103. The apparatus of claim 102 wherein:

the support member comprises a housing configured to be implanted at least partially within the skull, the housing having a cavity; and

the pulse system comprises a power supply and a pulse generator within the cavity of the housing.

104. The apparatus of claim 102 wherein:

the support member comprises a housing configured to be implanted at least partially within the skull, the housing having a cavity; and

the pulse system comprises a pulse generator within the cavity of the housing.

105. The apparatus of claim 102 wherein:

the support member comprises a housing configured to be implanted at least partially within the skull, and the housing has a cavity; and

the pulse system comprises a pulse delivery system within the cavity of the housing, the pulse delivery system having a receiver for receiving a pulse of broadcast energy generated by an external pulse generator and a pulse former for converting the broadcast energy into an electrical pulse within the support member.

106. The apparatus of claim 102 wherein:

the support member comprises a housing configured to be implanted at least partially within the skull, and the housing has a cavity;

the pulse system comprises a pulse delivery system within the cavity of the housing, the pulse delivery system having a magnetic pickup coil for receiving a pulse of magnetic energy generated by an external pulse generator; and

the first and second electrodes are electrically coupled to the pulse system within the housing.

107. The apparatus of claim 102 wherein:

the support member comprises a housing configured to be implanted at least partially within the skull, and the housing has a cavity;

the pulse system comprises a pulse delivery system within the cavity of the housing, the pulse delivery system having an antenna capable of receiving RF energy and a pulse former coupled to the antenna; and

the first and second electrodes are electrically coupled to the pulse system within the housing.

108. The apparatus of claim 102, further comprising a mechanical biasing element carried by the support member and coupled to the first and second electrodes.

109. An apparatus for applying electrical stimulation to a cortical region of a brain of a patient, comprising:

an implantable support member configured to be implanted into the patient proximate to a skull of the patient;

a mechanical biasing element carried by the support member, the mechanical biasing element being elastically deformable; and

a first electrode and a second electrode, wherein the biasing element is configured to press the first and second electrodes against the brain of the patient.

110. The apparatus of claim 109 wherein the biasing element comprises a compressible foam.

111. The apparatus of claim 109 wherein the biasing element comprises a spring.

112. The apparatus of claim 109 wherein the biasing element comprises an inflatable bladder.

113. The apparatus of claim 109, further comprising a pulse system carried by the support member.

114. The apparatus of claim 113 wherein:

the support member comprises a housing configured to be implanted at least partially within the skull, the housing having a cavity; and

the pulse system comprises a power supply and a pulse generator within the cavity of the housing.

115. The apparatus of claim 113 wherein:

the support member comprises a housing configured to be implanted at least partially within the skull, the housing having a cavity; and

the pulse system comprises a pulse generator within the cavity of the housing.

116. The apparatus of claim 113 wherein:

the support member comprises a housing configured to be implanted at least partially within the skull, and the housing has a cavity; and

the pulse system comprises a pulse delivery system within the cavity of the housing, the pulse delivery system having a receiver for receiving a pulse of broadcast energy generated by an external pulse generator and a pulse former for converting the broadcast energy into an electrical pulse within the support member.

117. The apparatus of claim 113 wherein:

the support member comprises a housing configured to be implanted at least partially within the skull, and the housing has a cavity;

the pulse system comprises a pulse delivery system within the cavity of the housing, the pulse delivery system having a magnetic pickup coil wrapped around the core for receiving a pulse of magnetic energy generated by an external pulse generator; and

the first and second electrodes are electrically coupled to the pulse system within the housing.

118. The apparatus of claim 113 wherein:

the support member comprises a housing configured to be implanted at least partially within the skull, and the housing has a cavity;

the pulse system comprises a pulse delivery system within the cavity of the housing, the pulse delivery system having an antenna capable of receiving RF energy and a pulse former coupled to the antenna; and

the first and second electrodes are electrically coupled to the pulse system within the housing.

119. The apparatus of claim 109, further comprising an external controller having a power supply, a pulse generator and a pulse transmitter, wherein the external controller is electrically coupled to the electrodes by a cable.

120. The apparatus of claim 109, further comprising:

an external controller having a power supply, a pulse generator and a pulse transmitter, wherein the external controller generates a pulse of broadcast energy; and

a pulse system carried by the support member separate from the external controller, wherein the pulse system is capable of converting the broadcast energy from the external controller into a corresponding electrical pulse; and

wherein the electrodes are coupled to the pulse system.

121. An apparatus for applying electrical stimulation to a cortical region of a brain of a patient, comprising:

an implantable support member configured to be implanted into the patient proximate to a skull of the patient;

a pulse system within the support member;

a biasing element carried by the support member; and

an electrode attached to the biasing element and electrically coupled to the pulse system.

122. The apparatus of claim 121 wherein the support member, the pulse system, the biasing element and the electrode have a total weight of not greater than 35g.

123. The apparatus of claim 121 wherein the support member and the pulse system occupy a volume of not greater than 20 cubic centimeters.